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Role of Community Pharmacist in Public Health Services, Riyadh, Saudi Arabia

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Introduction: Currently, the scope of practice has allowed pharmacists to engage in the clinical aspects of direct patient care and public health services to the patient. This study's main objective is to investigate community pharmacists' involvement in public health services and the barriers in the health system that hinder the integration of community pharmacy professionals into the public health task in the local context of Saudi Arabia. **Methods**: A cross-sectional survey was conducted in community pharmacies in a different region of Riyadh, Saudi Arabia (June and July 2019). A sample was calculated to include 431 pharmacists working in different community pharmacies proportionally randomly selected from the five areas in Riyadh city. A multistage, stratified, random sample method was used. Data analysis was performed using SPSS software. A p value < 0.05 considered as statistically significant. **Results**: The 431 participants showed the dominance of male pharmacists (97.2%), non-Saudi (84.9%), and Bachelor pharmacy degrees (81.2%). Most of the participants were involved in smoking cessation (83.1%) as public health services, weight management (62.4%), but less involvement in activities related to physical activities or dietary intake (33.0% and 31.8%, respectively). More likely the involvement of the Saudi pharmacist in lifestyle activities in comparison to non-Saudi (AOR: 1.932; 95% CI: 1.125–3.320). Moreover, the perceived barrier in the involvement level was more associated with years of experience. **Conclusion**: This study shows that community pharmacists should play an important role in health promotion and prevention; they recognize a wide gap between ideal and actual levels of participation; however, many obstacles limit the role of the pharmacist in public health.

Feasibility and Economic Value of Reusing the Remaining Anti-Cancer Drugs in a Preparation Unit

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Introduction: The use of anticancer residues is conditioned by the physicochemical and microbiological stability of the drug as well as the conditions of preparation; therefore, the open material thrown away constitutes a real economic loss. This study aims to evaluate the feasibility and savings generated by the management of the remainders of expensive anti-cancer drugs. **Methods**: Our unit carries out more than 2500 preparations per year under a vertical laminar air flow hood and with the necessary means of protection, as long as it is not centralized, and we cannot ensure microbiological stability for more than 24 hours. To minimize the cost related to the material thrown away, we planned treatment appointments while encouraging the reuse of opened bottles. This solution should respect the stability of the drug after opening, and the patient does not have to be impacted by the new reorganization. The study took place over 12 weeks and involved two molecules, bevacizumab and trastuzumab, given their high price and the significant losses already noted in the last 3 months. The leftovers generated were packaged and identified. Each week, expired materials were estimated in volume then in dinars (DA). **Results**: The average savings were 134,355.80 DA and 23,097 DA per month for the two molecules, respectively, following an average reduction of 52.47% and 9.49% of expired material thrown away per month. **Conclusion**: The proper use of injectable anti-cancer drugs remains the responsibility of the pharmacist, which does not only rely on the correct protocols and preparation conditions, but also on rigorous management of the remainders, which constitutes a real financial gain.

Real-World Data Gathering Using Obstetric Electronic Health Record (ObsCare) During the COVID-19 Pandemic Compared With the Previous 2 Years

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Introduction: This study aims to show how the obstetric electronic health record (ObsCare) enabled the collection of data to measure changes found in obstetrics services (childbirth and complications) during the COVID-19 pandemic compared to the 2 years before this period (2018 and 2019). **Methods:** This is a retrospective observational study using real-world data collected from ObsCare in eight Portuguese public hospitals. The data cohort was analyzed during the following two periods: the pre-COVID-19 period, comprising March–November 2018 and March–November 2019, and the period during the COVID-19 pandemic, comprising March–November 2020. ObsCare collects women's sociodemographic data (such as maternal age, body mass index, level of education), childbirth data, childbirth complications, and newborn data, among other data. An appropriate statistical analysis was performed considering a significance level of $p < 0.05$. The study was approved by the Ethics Committee. **Results:** Our sample is based in 14% of the deliveries occurred in Portugal. In all 3 years, the most frequent type of delivery was non-instrumental vaginal delivery, followed by caesarean and instrumental vaginal delivery (Table 1). For the types of deliveries non-instrumental vaginal delivery and caesarean there are significant statistical differences. Considering the onset labor, there

Table 1. Childbirth variables collected by the obstetric electronic health record (ObsCare) during the COVID-19 pandemic compared with the two previous years

	All Hospitals [March - December]									
	2018			2019			2020			Pre-Pandemic/Pandemic
	N	%	$CI_{95\%}$	N	%	$CI_{95\%}$	N	%	$CI_{95\%}$	*p-value*
Type of delivery	**12286**			**11917**			**11655**			0,001*
Caesarean section	3319	27,0	[26,2;27,3]	3503	29,4	[28,6;30,2]	3545	30,4	[29,6;31,3]	0,001*
Non-instrumental vaginal delivery	2664	21,7	[20,1;22,4]	2586	21,7	[21,0;22,4]	2582	22,2	[21,4;22,9]	0,321
Instrumental vaginal delivery	6303	51,3	[50,4;52,2]	5828	48,9	[48,0;49,8]	5528	47,4	[46,5;48,3]	0,001*
Missing	0	0	-	1	0	-	2	0	-	
Gestacional age, according Robson Classification	**12265**			**11897**			**11642**			0,002*
Preterm	1043	8,5	[8,0;9,0]	1000	8,41	[7,9;8,9]	871	7,5	[7,0;8,0]	
Term	11222	91,5	[91,0;92,0]	10897	91,6	[91,1;92,1]	10771	92,5	[92,0;93,0]	
Missing	21	0,2	-	21	0,2	-	15	0,1	-	
Number of foetuses, according Robson Classification	**12286**			**11918**			**11657**			0,337
Singleton	12060	98,16	[97,9;98,4]	11724	98,4	[98,2;98,6]	11471	98,4	[98,2;98,6]	
Multiple	226	1,84	[1,6;2,1]	194	1,63	[1,4;1,9]	186	1,6	[1,4;1,8]	
Fetal lie and presentation, according Robson Classification	**12261**			**11893**			**11623**			0,665
Cephalic	11494	93,7	[93,3;94,2]	11150	93,8	[93,3;94,2]	10887	93,7	[93,2;94,1]	
Breech	743	6,1	[5,6;6,5]	725	6,1	[5,7;6,5]	720	6,19	[5,8;6,6]	
Transverse	24	0,2	[0,1;0,3]	18	0,15	[0,1;0,2]	16	0,14	[0,1;0,2]	
Missing	25	0,2	-	25	0,2	-	34	0,3	-	
Parity, according Robson Classification	**12286**			**11918**			**11657**			0,536
Nullipara	5919	48,2	[47,3;49,1]	5757	48,3	[47,4;49,2]	5664	48,6	[47,7;50,0]	
Multipara	6367	51,8	[51,0;52,7]	6161	51,7	[50,8;52,6]	5993	51,4	[50,5;52,3]	
Previous caesarean section, according Robson Classification	**12286**			**11918**			**11657**			0,816
None	10656	86,7	[86,1;87,3]	10287	86,3	[85,7;87,0]	10076	86,4	[85,2;87,1]	
One or More	1630	13,3	[12,7;13,9]	1631	13,7	[13,0;14,3]	1581	13,6	[12,9;14,2]	
Onset of labour, according Robson Classification	**12272**			**11891**			**11615**			0,001*
Absence labour (Elective CS)	1456	11,9	[11,3;12,4]	1584	13,3	[12,7;13,9]	1659	14,3	[13,7;14,9]	0,001*
Spontaneous	7317	59,6	[58,8;60,5]	6976	58,7	[57,8;59,6]	5666	48,8	[47,9;49,7]	0,001*
Induced	3499	28,5	[11,3;12,44]	3331	28,0	[27,2;28,8]	4290	36,9	[36,1;37,8]	0,001*
Missing	14	0,1	-	27	0,2	-	42	0,4	-	
Episiotomy - Instrumental vaginal delivery	**2664**			**2586**			**2582**			0,001*
No	1207	45,3	[43,4;47,2]	679	26,3	[24,6;28,0]	627	24,3	[22,6;25,9]	
Yes	1457	54,7	[52,8;56,6]	1907	73,7	[72,0;75,4]	1955	75,7	[74,1;77,4]	
Episiotomy - Non-instrumental vaginal delivery	**6303**			**5828**			**5528**			0,015*
No	4156	65,9	[64,8;67,1]	3528	60,5	[59,3;61,8]	3396	61,4	[60,2;62,7]	
Yes	2147	34,1	[32,9;35,2]	2300	39,5	[38,2;40,7]	2132	38,6	[37,3;39,9]	

are significant statistical differences between its several types. Hence, in the pre-pandemic period, the onset labor type induced was 28% and during the pandemic period it was was 37%. **Conclusion:** After allocating costs for each hospital for each procedure and for each diagnosis, it is possible to carry out an economic evaluation. In this way, ObsCare is a key tool in the decision-making process.

Treatment Outcomes and Healthcare Resources Utilization of iCDK4/6 in Advanced Breast Cancer

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Introduction: Palbociclib (PAL), Ribociclib (RIB) and Abemaciclib (ABE)-CDK4/6 Inhibitors in combination with hormonotherapy changed the paradigm of treatment in HR+/HER2- advanced breast cancer. However, their inclusion in clinical practice was based on randomized controlled trials (RCT) with specific inclusion and exclusion criteria and in a controlled environment. Therefore, it is essential to study the treatment effectiveness in a real-world environment. Real-world evidence studies answer questions unaddressed on RCTs, which allows universal assessment of a drug in a real-world context and paves the way for better health outcomes and cost-effectiveness of new health technologies, helping doctors, pharmacists, and managers to make strategic decisions and deliver better healthcare. This study aims to determinate effectiveness and healthcare resources utilization (HCRU) among patients treated with PAL, RIB and ABE. **Methods**: This was a real-world retrospective study including 247, 110, and 12 patients treated with PAL, RIB, and ABE, respectively, in a Portuguese Comprehensive Cancer Center (PCCC) between Mar 17 and Dec 21. Data were collected from medical/administrative records. Treatment outcomes such as progression-free survival (PFS), overall survival (OS), treatment duration (TD), and HCRU were evaluated. Clinical characteristics and HCRU were evaluated using descriptive statistics. Kaplan-Meier method was used for survival analysis. **Results**: Median age was 60, 58, and 59 y/o for patients treated with PAL, RIB, and ABE, respectively. For PAL, 16.8% patients were pre-menopausal, 50.6% visceral metastasis and 71.3% bone metastasis only. On average, there were 14 Oncology (MO) visits and 7 CT scans performed. 54 patients were referred to best-supportive care (BSC).14.2% were hospitalized. For RIB, 20.4% patients were pre-menopausal, 54.5% visceral metastasis and 68.0% bone metastasis only. 16 MO visits and 8 CT scans performed. 12 patients were referred to BSC. 14.5% were hospitalized. For ABE, 16.7% patients were pre-menopausal, 75.0% visceral metastasis and 66.7% bone metastasis only. 7 MO visits and 4 CT scans were performed. PAL, RIB, and ABE were prescribed with fulvestrant (FUL) or aromatase inhibitors (AI) in first line therapy or subsequent lines. Median PFS was 10.5 m for PAL+FUL in first line and 9.9 m for subsequent lines. First line PAL+IA median PFS was 27.1 m. Three-years OS probability was 55.2%, 46.6%, 74.0%, and 71.5% for patients in PAL+FUL first line, PAL+FUL second line, PAL+IA first line, and RIB+IA first line, respectively. **Conclusions**: The median cycles were 8, 8, 11, and 13.5 for PAL+FUL first line, PAL+FUL second line, PAL+IA first line, and RIB+IA first line, respectively. This study supports the clinical benefit derived from iCDK4/6 complementing with hormonotherapy, with different toxicity profiles. Prolonged follow-up of these patients will result in more robust data and deeper understanding of drug effectiveness.

Assessment of Quality of Life in Patients With Upper Respiratory Tract Infection Using EQ-5D-5L

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Introduction: Upper respiratory tract infections (URTI) are the most common diagnoses reported in the emergency departments (ED). Unnecessary use of antibiotics for treatment of several infections resulted in substantial effect on patient care and health care costs. Currently, there are no data on URTI and quality of life (QoL) in Saudi Arabia. The aim of this study was to evaluate the impact of URTI and related sociodemographic characteristics on health-related quality of life (HRQoL) in Saudi Arabia using the EuroQol 5- Dimension 5-Level (EQ-5D-5L) instrument. **Methods**: This was a cross-sectional questionnaire study conducted in the ED of a tertiary hospital over one -month period. **Results**: A total of 596 out of 750 adult patients with a mean age of 31.2 years (SD: 8.57 years; range 19–59 years) completed the baseline questionnaire (EQ-5D-53L), for a response rate of 79.5%. The baseline utility index for the worst health state ("545432") represented 0.2% of the patients, and the full health state ("11111") was 1, corresponding to 27% of the patients. The mean EuroQol Visual Analogue Scale (EQ- VAS) score was 79 ± 26 before treatment. The frequency of patients reporting problems in the EQ-5D-5L survey decreased following treatment (27.43% vs 0.88%, 4.42% vs 0.88%, 25.96% vs 6.78%, 61.95% vs 13.27%, and 39.52% vs 15.63% for mobility, self-care, usual activities, pain / discomfort, and anxiety / depression, respectively; all $p < 0.001$). There were statistically significant differences in terms of

anxiety/depression between males and females. There were statistically significant associations between HRQoL and socio-demographic characteristics, chronic diseases, and herbal supplements. **Conclusion**: URTIs have a significant negative impact on the HRQoL of patients with a varying effect depending on the sociodemographic characteristics and chronic diseases.

Efficacy and Cost Impact Analysis of β-Lactam/Macrolide Therapy Antibiotics in Treatment of Upper Respiratory Tract Infections in the Emergency Department

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Introduction: Upper respiratory tract infections (URTIs) are one of the main reasons for emergency department (ED) visits. Many antibiotics can be used for URTI treatment. Currently, no data concerning URTIs and cost effectiveness have been reported in Saudi Arabia. This study aimed to investigate antibiotic and cost effectiveness of β-lactams and macrolide as a first-line URTI treatment. **Methods**: This study was a retrospective cohort based on a five-arm comparative outcome analysis. A cost effectiveness analysis in conjunction with comparative antibiotic treatment of URTIs in the ED with a 3-month follow-up period was done. Decision trees were used to compare the costs and effects of different antibiotic treatments (i.e., amoxicillin, amoxicillin/clavulanic acid, cefuroxime, cefprozil , azithromycin, and clarithromycin). The main outcomes were effectiveness in terms of cure rates and estimations of cost effectiveness among this group. **Results**: A total of 1759 patients who presented with URTIs were enrolled (adult 49.4% and pediatric 50.6%). Most patients (92.1%) completely recovered, whereas 7.9% of patients were readmitted to the ED with same recurrent infections. In adults, the effectiveness in terms of the highest cure rate was observed with amoxicillin, followed by augmentin, cefuroxime, azithromycin, and clarithromycin (94%, 92%, 91%, 90%, and 88.6%, respectively); there were no clinically significant differences in cure rates. In pediatric, the highest cure rates were observed with clarithromycin followed by cefprozil, amoxicillin, and azithromycin (96%, 95%, 92%, and 92%, respectively); no significant differences in cure rates. The cost effectiveness analysis in adults indicated

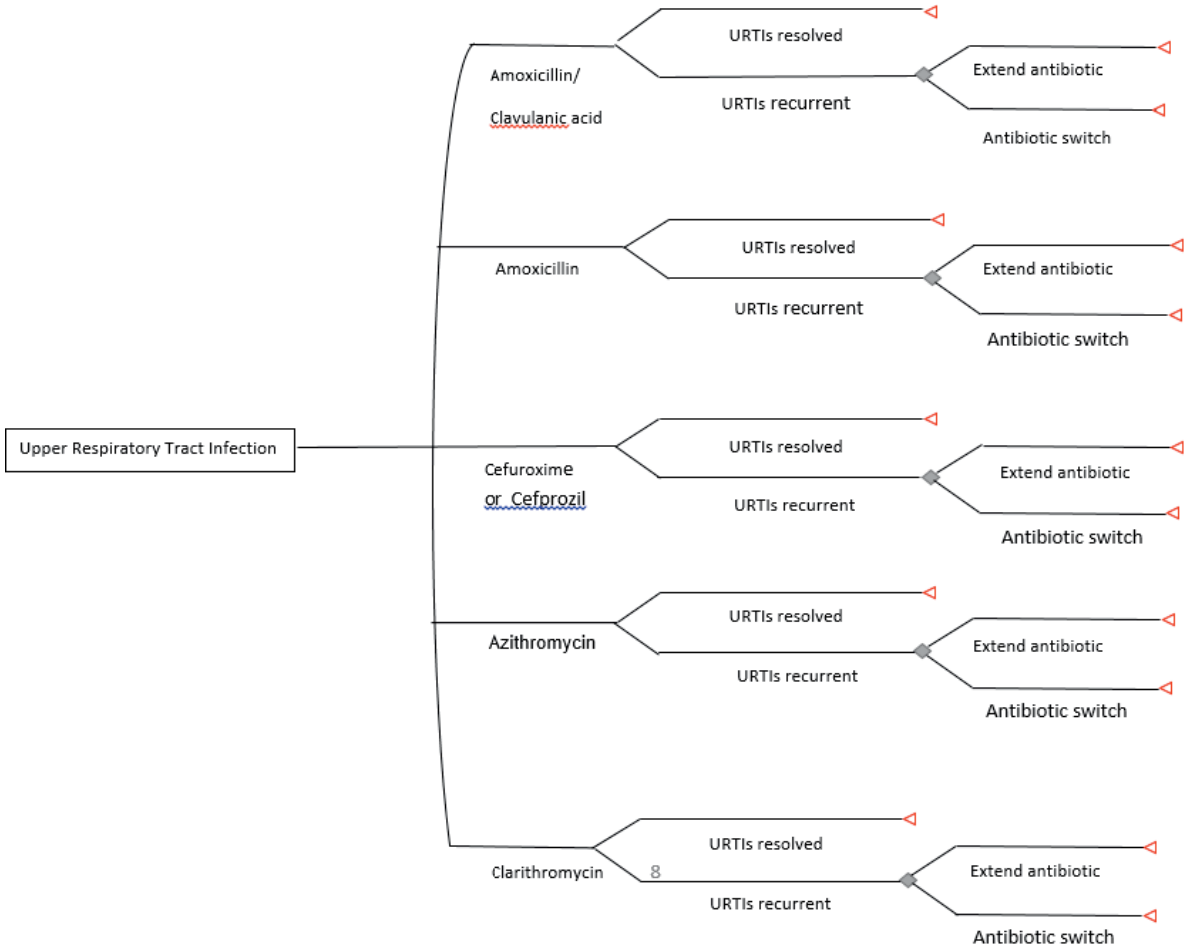

Figure 1. Antibiotic decision tree for cost-effectiveness analysis of upper respiratory tract infections (uURTI)

that azithromycin presented the highest cost effectiveness followed by amoxicillin, amoxicillin/clavulanic acid, clarithromycin, and cefuroxime. In pediatrics, amoxicillin presented the highest cost effectiveness followed by amoxicillin/clavulanic acid, clarithromycin, and azithromycin. See Figure 1. **Conclusion**: A comparison of five antibiotics for URTI treatment did not yield clinically significant differences in cure rates. Amoxicillin was more cost-effective than the other antibiotics in the treatment of URTI in pediatrics, and azithromycin was more cost-effective than the other antibiotics in the treatment of URTI in adults.

An Evaluation of Expenditure and Expired Pharmaceuticals Cost Impact in Health Facilities at Saudi Arabia

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Introduction: Globally, medication waste is a serious public health problem and with negative impacts on economics and the environment. Accumulation of unused inventory in warehouses government sectors cause unnecessary expenditure on the governments, resulted in interruption and poor quality of health services, and increases expenses. Limited studies have been conducted on the causes and economic impacts of unused in warehouses of medical facilities. This study aims to estimate the prevalence of waste medication (expired and non-moving) in medical facilities, identify the cost impact of unused inventory, identify type of unused medication by using ABC-VED matrix analysis, and assess new strategies to minimize the waste of inventory. **Methods**: A cross-section study design was used to review logistic data retrospectively from health Enterprise Resource Management (ERP), over 7 years (May 2015–June 2022) in health facilities of Ministry of National Guard at Riyadh. The unused and expired inventory were classified based on the monetary value and quantity as follows. *ABC analysis*: based on monetary value; *VED analysis*: vital (V), essential (E), and desirable (D) categories. This classification was based on the user's experience and perception. Turnover was used to identify the rate of consumption inventory. Descriptive and inferential statistics were made using a statistical package for social sciences version 20. **Results**: The overall prevalence of wastage medication during study period was 3% of all formulary drugs (42 out of 1400). The monetary value was 0.7% of total pharmaceutical expenditures in central region (non-moving representing 5%, and expired was 95%). The majority of expired category of medications were antineoplastic, biological, anti-infective, and vaccines, which represented two thirds of monetary value. The top of expired drug was Hepatitis B immunoglobulin. On VED analysis, an average of 26% of the items were vital, 34% were essential. **Conclusion**: This research helps decision makers to design an appropriate system for the improvement of the whole supply chain productivity and minimize the wastage of inventory. Also, this study may be used as baseline data for future studies.